

3Rs initiatives for GA mice

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Introduction

The number of genetically altered (GA) mice used in scientific procedures within the UK and internationally has risen significantly, welfare and logistical challenges in terms of applying the principles of the 3Rs (Replacement, Reduction & Refinement).

With this in mind, the RSPCA has set up three expert working groups to identify and promote contemporary good practice in relation to GA passports, training in transgenic technology, and the sharing and archiving of GA mice.

This poster will provide an introduction to each of the working groups together with details of some new key resources for the mouse genomics community.

For more information visit www.rspca.org.uk/science/group/researchanimals/implementingthe3rs or email GA@rspca.org.uk

Resource Sharing Working Group

Sharing model organisms and the use of archive facilities represents an important refinement with additional possibilities for reduction, that has benefits

not only for animal welfare, but also the quality and advancement of scientific research. To investigate how to promote the sharing and archiving of GA animals the Resource Sharing Working Group (RSWG) was convened with member representing the BBSRC, Cancer Research UK, MRC and NC3Rs.

Resources

- A booklet entitled “Sharing and Archiving of genetically altered mice: opportunities for reduction and refinement” outlines current good practice in the sharing and archiving of GA mice (see below for more information).

GA Passports Working Group

The movement of GA animals between establishments is becoming more widespread. This raises the issue of how to ensure that information can be used to improve welfare and minimise potential pain, suffering and distress, is accessible to those who care for them throughout their lifetime. With this in mind the **GA Passport Working Group (GAPWG)** was convened with three main aims:

- to consolidate progress made in the routine welfare assessment and the development of welfare/phenotypic databases, with the idea of ‘mouse passports’
- to promote the idea of ‘passports’ for all GA animals, and
- to establish the use of GA passports as routine good practice when transferring animals between establishments where the journey ends with a new set of carers.

Resources

- The working group is shortly to publish a booklet entitled “**GA Passports: The key to consistent animal care**” (see below).

Transgenic Training Working Group

Good training for staff caring for and using laboratory animals is essential in order for the 3Rs to be fully implemented. The question of how additional training can best be provided in specific scientific fields with particular **specialist in vivo procedures** has been raised but not answered. The **Transgenic Training Working Group (TTWG)** was convened to discuss training issues and how best to disseminate contemporary good practice and implementation of the 3Rs within the transgenic field.

Sharing and archiving of genetically altered mice: Opportunities for reduction and refinement

Introduction

The number of genetically altered (GA) mice used in scientific procedures has risen significantly over the last 10 years and continues to do so. This poses serious ethical and welfare issues for mice used in research and requires those who care for them to be given the best possible welfare and care. This poster provides an introduction to the RSWG and its aims.

Why? The ethical and welfare benefits of sharing and archiving

Reduction: Reducing the number of GA mice generated and used in research, which reduces the number of mice used in research, and the number of mice used in research.

Refinement: Reducing the number of GA mice generated and used in research, which reduces the number of mice used in research, and the number of mice used in research.

Why? Why is it needed to prevent the generation of both sexes...?

To prevent duplication of mice, it is essential to ensure that mice are used in research, and the number of mice used in research, and the number of mice used in research.

Why? To prevent duplication of mice...

To prevent duplication of mice, it is essential to ensure that mice are used in research, and the number of mice used in research, and the number of mice used in research.

Why? To ensure that mice are used...

To ensure that mice are used in research, it is essential to ensure that mice are used in research, and the number of mice used in research, and the number of mice used in research.

Members of the RSPCA Resource Sharing Working Group (RSWG)

Nikki Osborne (Coordinator, RSWG)
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For a copy of the report email GA@rspca.org.uk or visit www.rspca.org.uk/science/group/researchanimals/implementingthe3rs

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Events

- A 1-day meeting entitled **“Transgenics and the 3Rs – What’s it all about?”** will be held on the **12th April 2010** for animal care and technical staff, or anyone wanting a refresher on the basics (see below).
- A 2-day residential course entitled **“Managing Mouse Colonies – Genetics, Breeding & Welfare”** is being held **20th-21st July 2010** for experienced technicians and scientific staff involved with the management of GA colonies (see below).

Resources

- Posters detailing contemporary good practice in the production, housing and care of GA mice (see below).

Acknowledgements

I would like to take this opportunity to thank all working group members for their time and effort taken to attend meetings, organise events and produce the resources. I would also like to thank EUMODIC, IAT and LASA for their financial support funding Transgenic Training events.

Transgenics and the 3Rs
What's it all about?

What are GA animals?
Animals that have had their genomes edited intentionally to change a specific gene or to insert a new gene into their genome. This is done for the purpose of studying a gene or the function of a protein.

How are GA animals created?
The most common methods involve using CRISPR/Cas9 technology to edit specific genes or to insert a new gene into the genome. This is done by using a virus to deliver the CRISPR/Cas9 system to the cells of the animal. The system then makes the desired edit to the genome.

Replacements
Before creating a mouse for animal research, the scientific team should consider the following:
 - Use the most appropriate mouse model for the study.
 - Use the most appropriate mouse model for the study.
 - Use the most appropriate mouse model for the study.

Refinements
Consider using conditional and reporter strains or targeted approaches to help reduce harm to animals. Only female mice weighing more than 12g should be used for organ donation or surgery.
 - Avoid using animals that are aged, pregnant, or lactating.
 - Use the most appropriate mouse model for the study.
 - Use the most appropriate mouse model for the study.

Reduction
Optimize the design, execution, and reporting of the experiment to reduce the number of animals used. This can be achieved by using the 3Rs to reduce the number of animals used in the experiment.

3Rs
 - **Replacement:** Using alternative models or methods to reduce the number of animals used.
 - **Refinement:** Using techniques to reduce the pain, suffering, and distress of animals.
 - **Reduction:** Using techniques to reduce the number of animals used.

For more information, visit the RSPCA website at www.rspca.org.uk

Transgenics and the 3Rs
Good practice and care

GA animals & RSPCA 1986
Under RSPCA 1986 it is prohibited to create or maintain a mouse for the purpose of studying a gene or the function of a protein. This is done for the purpose of studying a gene or the function of a protein.

Good Practice
When breeding animals for research purposes, there are good lines of communication and regular contact with the RSPCA. This is done for the purpose of studying a gene or the function of a protein.

Care and Welfare
GA animals are all different, some groups will be more sensitive than others. It is important to understand the specific needs of each group and to provide care that is appropriate to their needs.

3Rs
 - **Replacement:** Using alternative models or methods to reduce the number of animals used.
 - **Refinement:** Using techniques to reduce the pain, suffering, and distress of animals.
 - **Reduction:** Using techniques to reduce the number of animals used.

The RSPCA, together with LASA and IAT, will be holding a one-day meeting entitled...

Transgenics and the 3Rs - what's it all about?

This meeting will introduce animal care staff, who are new to dealing with genetically altered rodents, or those who want a refresher, to current best practice in the care, welfare and production of GA animals.

The event will be limited to 90 participants and take place 10am - 4pm on **Monday 12th April 2010** at a venue in the Midlands.

Topics to include:

- Creation of GA animals
- Cryopreservation and ART
- Genetics and Breeding Schemes
- GA Animals and RSPCA 1986
- Animal Care and Welfare
- Site for GA animals

Cost £30 (£20 discounted rate available for LASA and IAT members)

Applicants are encouraged to submit poster abstracts relating to the care of GA animals, environments and refinements.

To register contact the RSPCA Research Animals Department at: GA@rspca.org.uk (please put 'transgenics 3Rs meeting' in the subject box)

The RSPCA and EUMODIC will be holding a two-day course entitled...

Managing Mouse Colonies: Genetics, Breeding & Welfare

The course, a collaboration between MRC Harwell, the Leeds Institute of Molecular Medicine, the RSPCA and the Wellcome Trust Sanger Institute, will introduce experienced technicians and scientific staff involved with the management of GA mice, to current best practice in the maintenance of GA mouse colonies for scientific research, with an emphasis on the 3Rs and animal welfare.

This event will be limited to 20 participants and take place on the **20th & 21st July 2010** at the Wellcome Trust Sanger Institute, UK.

Topics to include:


- Establishing & maintaining transgenic lines
- Establishing & maintaining gene targeted lines
- An introduction to genetic/strain nomenclature
- Basic colony management
- Breeding methods
- Advanced colony management
- Identifying and overcoming common issues
- Maintenance of high health status colonies
- Cross-contamination/breath workshop
- Experimental design workshop

Cost £110 (to cover all accommodation, food and course materials)

For more information, or to obtain an application form, please email: ga@rspca.org.uk (subject: 'Managing Mouse Colonies course') before 31st March 2010.

Sharing and archiving of genetically altered mice:

Opportunities for reduction and refinement



GA passports:

The key to consistent animal care

